Repair Instructions – Refrigeration

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Concerning this document

1.1 Important information

Read and observe chapter 2 "Safety" before performing any work!

1.1.1 Purpose

These repair instructions form the basis for a systematic and safety conscious procedure for the repair of domestic appliances.

These repair instructions include information about troubleshooting and repair.

1.1.2 Target group

These repair instructions are intended for persons who are familiar with equipment technology and were instructed by BSH or an authorised body:

- Service technicians for the repair of domestic appliances
- Pre-assemblers in the spare part stockroom when determining required spare parts
- Call centre employees during order acceptance

1.1.3 Other applicable documents

The following documents include additional relevant repair information:

- General repair instructions
- Error codes and service programs
- Circuit diagrams
- Exploded drawings
- Parts lists
- Repair videos

1.2 Explanation of symbols

1.2.1 Danger levels

The warning levels consist of a symbol and a signal word. The signal word indicates the severity of the danger.

Warning level	Meaning
DANGER	Non-observance of the warning message will result in death or serious injuries.
WARNING	Non-observance of the warning message could result in death or serious injuries.
CAUTION	Non-observance of the warning message could result in minor injuries.
NOTICE	Non-observance of the warning message could result in damage to property.

Table 1: Danger levels

1.2.2 Hazard symbols

Hazard symbols are symbolic representations which give an indication of the kind of danger.

The following hazard symbols are used in this document:

Hazard symbol	Meaning
	General warning message
	Danger from electrical voltage
	Risk of explosion

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Hazard symbol	Meaning
	Danger of cuts
	Danger of crushing
	Danger from hot surfaces
	Danger from strong magnetic field
	Danger from non-ionizing radiation

Table 2: Hazard symbols

1.2.3 Structure of the warnings

Warnings in this document have a standardised appearance and a standardised structure.

	CAUTION **Type and source of danger!** Consequences of ignoring the warning. ► Actions to protect from danger.

The following example shows a warning that warns against electric shock due to live parts. The measure for avoiding the danger is mentioned.

	DANGER **Risk of electric shock due to live parts!** ► Disconnect the appliance from the mains at least 60 seconds before starting the work .

1.2.4 General symbols

The following general symbols are used in this document:

Gen. symbol	Meaning
	Identification of a special tip (text and/or graphic)
Start	Identification of a key or button
[00123456]	Identification of a material number
	Identification of a condition (if ..., then ...)
	Identification of a simple tip (only text)

Table 3: General symbols

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2.1 Qualification

In Germany, only qualified electricians trained by BSH or an authorised body may perform any repair work.

In other countries, only similarly trained qualified personnel is permitted to perform the repair work.

Appliances must only be repaired by persons that are qualified, **approved** and trained by BSH or an authorised body as instructed.

2.2 General safety information

2.2.1 All domestic appliances

Risk of electric shock due to live parts!
- Disconnect the appliance from the mains for at least 60 seconds before starting work.
- Do not touch the housing, components and cables.
- For tests on an energised system, use a residual current circuit breaker.
- Discharge high-voltage capacitors.

Risk of injury from sharp edges!
- Wear protective gloves.

Risk of injury when dealing with harmful substances!
- Observe the associated safety data sheet!

Risk to the appliance's safety / function!
- Only use original spare parts.

Risk of damage to electrostatically sensitive components (ESDs)!
- Before touching ESDs, use an electrostatic protection system (wristband with earth safe plug).
- Do not touch connections and conductor paths of the modules.
- Only transport ESDs in conductive materials or original packaging.
- Keep ESDs clear of electrostatically chargeable materials (i.e. plastic).

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2.3 Product-specific safety information

2.3.1 Microwave ovens

Risk of scalding due to explosive escape of liquids in case of delayed boiling!
- Before heating place a metal spoon in the liquid.

Health hazard due to non-ionising radiation!
- After any work on the appliance, check the tightness with leak rate measurement.

2.3.2 Induction appliances

Induction appliances fulfil the relevant regulations for safety and electromagnetic compatibility (EN 50366).

Danger to life due to magnetic fields!
- People with pacemakers should stay clear during repairs on an open appliance!

Health hazard due to magnetic fields!
- People with medical devices (for example insulin pump / hearing aid) should stay clear of the opened appliance!

2.3.3 Gas appliances

Explosion hazard due to escaping gas!
- Cut off the gas supply before working on gas carrying connections.
- Check tightness following work on connections carrying gas.
- Only repair gas appliances with original parts that were tested and released for such use.

If you smell gas!
- Do not press any electrical switches.
- Extinguish / keep clear of open flames.
- Ensure that room is well ventilated.
- Close the gas isolating equipment.

2.3.4 Refrigerators and freezers

Risk of burns caused by refrigerants!
- Wear protective gloves and goggles.

Explosion hazard due to refrigerants!
- Do not solder pipe connections, only use Lokring connections.
- Do not press any electrical switches.
- Keep clear of thermal appliances.
- Extinguish / keep clear of open flames.
- Ensure that room is well ventilated.

2.3.5 Dryer with heat pump

Risk of burns caused by refrigerants!
- Wear protective gloves and goggles.

Explosion hazard due to refrigerants!
- Do not solder pipe connections, only use Lokring connections.
- Do not press any electrical switches.
- Keep clear of thermal appliances.
- Extinguish / keep clear of open flames.
- Ensure that room is well ventilated.

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2.4 Measures after each repair

If the appliance is functional:
- Check according to VDE 0701 or country-specific regulations.
- Check external appearance, function and tightness.
- Document repair work, measured values and functional reliability.

If the appliance is **not** functional:
- Identify the appliance as “not functionally reliable”.
- Warn customers of commissioning and notify them in writing .

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3.1 B21CL80SNS Refrigerator Details

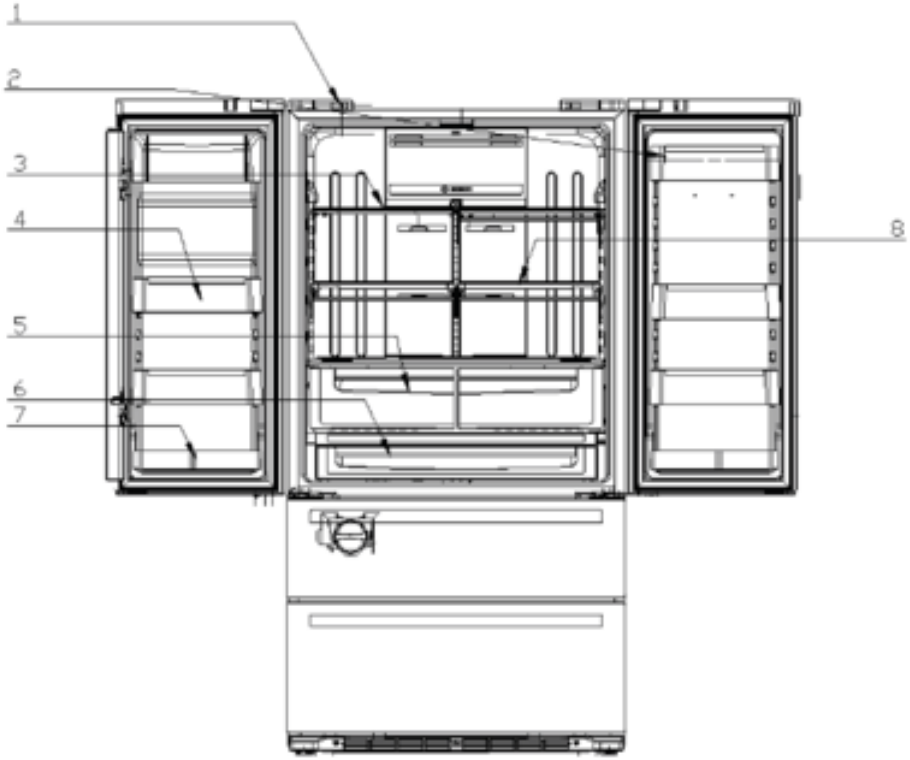

Fig. 1: ***Parts Location***

1 Door switch
2 Butter case
3 R - Compartment glass shelf
4 Door bin
5 Fruit and vegetable cases
6 F - Compartment drawer components
7 Small door shelf
8 Folding glass shelf

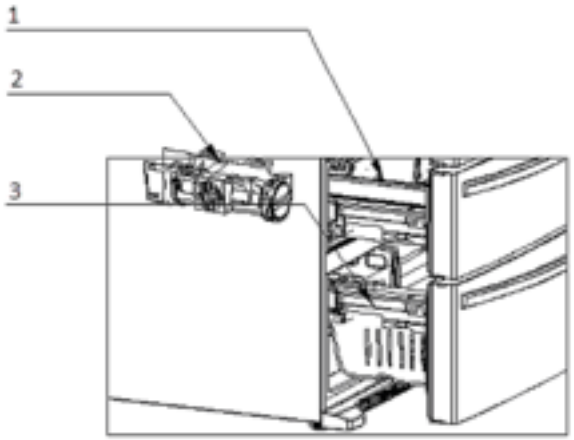

Fig. 2: ***Freezer components***

1 F - Compartment upper drawer
2 Ice maker
3 F - Compartment lower drawer

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DESCRIPTION	SPECIFICATION
Gross Volume	
Refrigerator	416 L (14.7 cuft)
Freezer	169 L (5.97 cuft)
Total	585 L (20.7 cuft)
External Dimension	
With Masterpiece Handle (Included)	911 mm (35.9") x 728.9 mm (28.7") x 1775 mm (69.9")
With Pro Handle (Available as an accessory)	911 mm (35.9") x 782.5 mm (30.8") x 1775 mm (69.9")
Rated Voltage	115 VAC (60Hz)
Overall weight	144 kg (317.465 lbs)

Table 4: Specifications

COOLING SYSTEM	
Compressor	
Model	BMA069L (Brand LG)
Voltage	115 VAC; 180 W
Motor type	GO300Y2
Motor protection	PCB S/W protection - OLP protection
Run Capacitor	N/A
Starting device type	Inverter
Starting device	Start up by inverter

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Refrigerant	R134A
Quantity	6.35 oz (180 g)
Cooling mode	Air cooling system
Evaporator type	Fin type
Condenser type	fan cooling system
Dryer	XH-9-4A

Table 5: Cooling System Information

Heater	
Item	**Specification**
Sheath R AS	115 VAC; 120 W
Sheath F AS	115 VAC; 250 W
Reversal beam heating wire	115 VAC; 11 W
Heater in bottom drawer air duct	12 VDC; 0.5 W
Heater in water inlet tube for ice maker	12 VDC; 2.5 W

Table 6: Heater Information

Electrical Components	
Item	**Specification**
Power cord	125 VAC; 15 A (UL) + Label
Defrost thermostat	250 VAC; 10 A; closes @ 77°C
R-Evaporator fan	12 VDC/2000 +/- 150 RPM
F-Evaporator fan	12 VDC/1850 +/- 150 RPM
Condenser fan	12 VDC/1150 +/- 150 RPM
Ice maker motor	12 VDC; 5 W
R-Dome lamp	26-LED
R-Left/Right lamp	6-LED x 2
F-Lamp	9-LED
R-Door switch	125 VAC 1 A
F-Door switch	125 VAC; 5 A/125 VAC; 6 A
Chill compartment air throttle	12 VDC; 1 W
Electric switching valve	12 VDC; 100 mA
Water valve	115 VDC; 20 W

Table 7: Electrical Component Specifications

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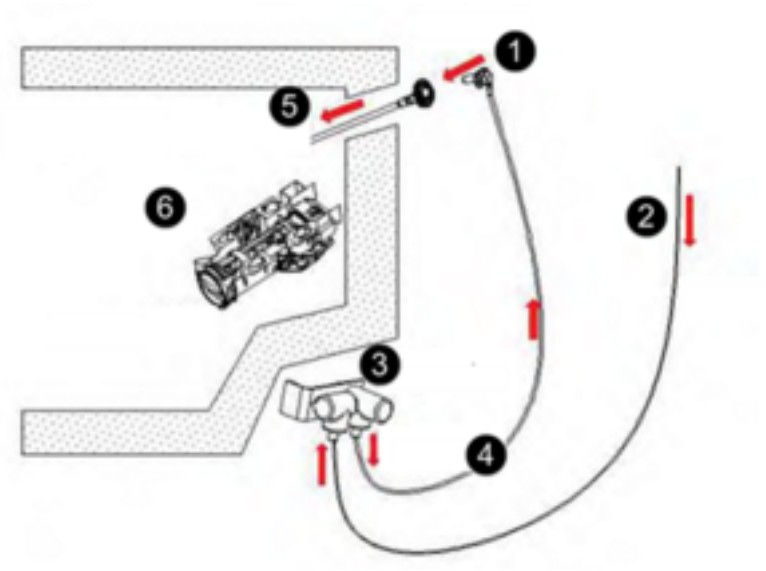

Fig. 3: Water flow system

1	Water connector	4	Water valve output line to icemaker
2	Input water supply	5	Inlet tube (Not serviceable)
3	Water valve	6	Ice maker

Removing Ice Maker

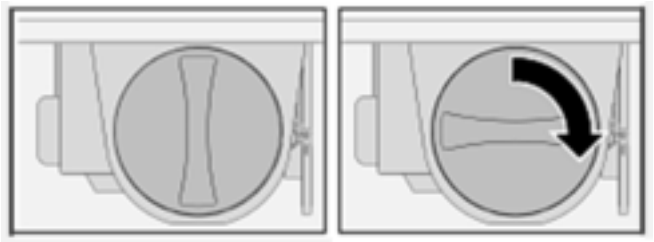

Fig. 4: Unlock ice maker

Rotate ice maker handle 90° clockwise.

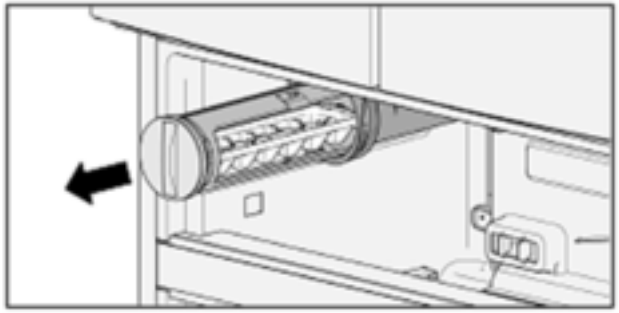

Fig. 5: Remove ice maker

Pull the ice maker tray completely out and away from assembly.

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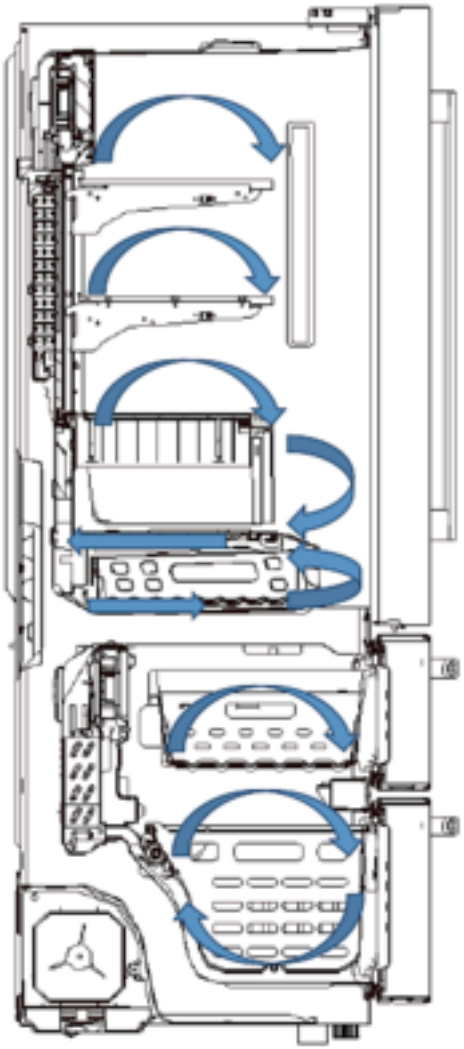

Fig. 6: Cold air circulation

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3.2 Internal Display Control Functions

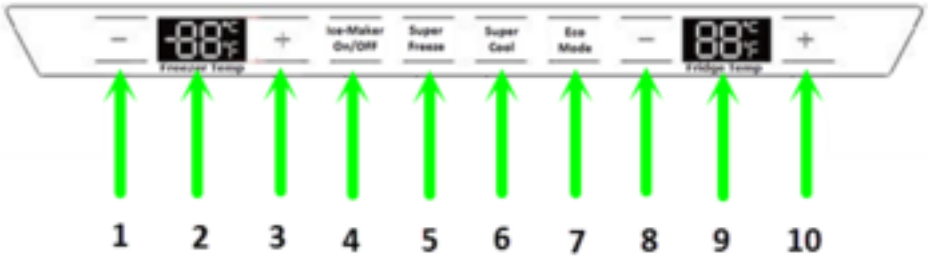

Fig. 7: ***B21CL81SNS Control Layout***

1	Freezer temperature decrease button	6	Super cool button
2	Freezer display	7	ECO mode button
3	Freezer temperature increase button	8	Refrigerator temperature decrease button
4	Ice maker On/OFF button	9	Refrigerator display
5	Super freeze button	10	Refrigerator temperature increase button

Fig. 8: ***Freezer Temperature Adjustment***

To adjust the temperature in the freezer section press the appropriate key pad "-" to decrease (1) or "+" to increase (3). When desired temperature is indicated in the display (2) release the key pad, the change will take affect in 15 seconds.

The default and recommended freezer setting is 0° F

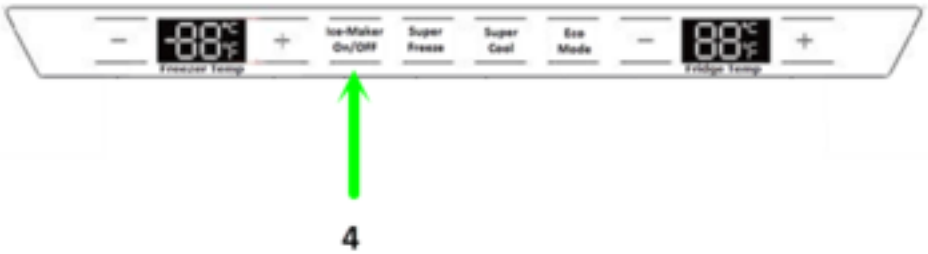

Fig. 9: ***Ice maker ON or OFF***

Start or stop the ice making function by pressing the "Ice maker On/OFF" key pad (4)

Fig. 10: ***Super Freeze Key Pad***

Start or stop the fast freezing function by pressing the "Super Freeze" key pad

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Fig. 11: ***Super Cool Key Pad***

Start or stop the super cool function in the refrigerator section by pressing the "Super Cool" key pad.

Fig. 12: ***ECO Mode Key Pad***

Start or stop the ECO mode by pressing the "ECO Mode" key pad

Fig. 13: ***Refrigerator Temperature Adjustment***

To adjust the temperature in the refrigerator section press the appropriate key pad "-" to decrease (8) or "+" to increase (10). When desired temperature is indicated in the display (9) release the key pad, the change will take affect in 15 seconds.

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4.1 Malfunction

Fault	Possible cause	Troubleshooting
Unit does not run	No power to unit	► Check for power at outlet. Check fuse box/circuit breaker for blown or tripped breaker ► Replace or reset as needed
	Faulty power cord	► Check cord for continuity ► Check that power is present at the outlet ► Replace or repair as necessary
	Low voltage	► Check input voltage for proper values ► Take appropriate action to correct voltage supply issue
	Faulty motor or freezer temperature control	► Check all connections are tight and secure ► Check control for operation ► Repair or replace as necessary
	Faulty timer	► Check timer operation and circuit ► Repair or replace as necessary
	Faulty relay	► Check relay, repair or replace as necessary
	Faulty compressor	► Check compressor motor winds for continuity ► Check all connections at compressor ► repair or replace as necessary
	Faulty overload	► Check overload for continuity ► Ensure the overload temperature is below the trip temperature before testing ► Repair or replace as necessary
Refrigerator section too warm	Excessive door opening	► Customer education
	Overloading of shelves	► Customer education
	Warm or hot foods placed in cabinet	► Consumer education
	Cold control set too warm	► Set control to colder setting
	Poor door seal	► Level the unit ► Adjust hinges ► Replace door gasket if necessary
	Refrigerator airflow	► Check damper is opening by removing grille ► With food door open, damper should open ► Replace damper if necessary ► Adjust control to colder temperature
	Interior light remains on	► Check door switch, replace if necessary
	Faulty condenser fan or evaporator fan	► Check fan and wiring, repair or replace as necessary
	Faulty compressor	► Replace compressor

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Fault diagnosis

Fault	Possible cause	Troubleshooting
Frost or ice on evaporator	Defrost thermostat faulty	► Check defrost thermostat, replace if necessary
	Evaporator fan faulty	► Check fan motor, replace if necessary
	Defrost heater remains open	► Check heater for continuity, replace if necessary
	Defrost control faulty	► Check control and replace if necessary
	Open wire or connector	► Check all wiring and connections in circuit ► Repair or replace as necessary
	Refrigerant shortage or restriction	► Check sealed system for leak or restriction ► Evacuate, repair and recharge system
Unit starts and stops frequently	Loose wire or thermostat connections	► Check wiring and connections, repair as necessary
	Supply voltage out of specification	► Check supply voltage ► Correct any supply issues
	Overload protector open	► Check overload protector for continuity ► If overload is open, replace part ► Ensure overload/compressor are below trip temperature
	Faulty compressor motor capacitor	► Check capacitor for open or short, replace if necessary ► NOTE: Discharge capacitor before testing
	Faulty fan motor	► Check fan motor and connections, replace if necessary
	Restricted air flow	► Check condenser and grille for debris, clean if necessary
	Refrigerant shortage or restriction	► Check sealed system for leak or restriction ► Evacuate, repair and recharge sealed system
Refrigerator section too cold	Refrigerator temperature control set too cold	► Adjust refrigerator temperature control to a warmer setting
	Refrigerator airflow not properly adjusted	► Check and adjust airflow accordingly
Freezer and refrigerator sections too warm	Temperature controls set too warm	► Adjust control to a cooler setting
	Poor door seal	► Level unit, adjust hinges and/or replace door gasket
	Dirty condenser or obstructed grille	► Check and clean condenser or grille of debris
	Faulty control	► Check control, replace if necessary
	Refrigerant shortage or restriction	► Check for sealed system leak or restriction ► Evacuate, repair and recharge sealed system
Freezer section too cold	Freezer temp control set too cold	► Adjust control to a warmer setting
	Faulty control	► Check control, replace if necessary
	Cold control capillary not properly clamped to evaporator	► Reposition clamp and tighten
Unit runs continuously	Temperature control set too cold	► Adjust temperature control accordingly

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Fault	Possible cause	Troubleshooting
	Dirty condenser or obstructed grille	► Check and clean condenser or grille as needed
	Poor door seal	► Level unit, adjust hinges and/or replace door gasket if necessary
	Interior light remains on	► Check door switch, replace if necessary
	Faulty condenser fan or evaporator fan	► Check fans and wiring, replace if necessary
	Faulty control	► Check control, replace if necessary
	Refrigerant shortage or restriction	► Check sealed system for leak or restriction ► Evacuate, repair and recharge sealed system
	Refrigerant overcharge	► Check system pressures ► Evacuate system and recharge to proper levels
	Air in system	► Check for lowside sealed system leak ► Evacuate system, repair leak and recharge system
Unit runs continuously. Temperature Normal	Ice on evaporator	► See “Frost or Ice on evaporator”.
Unit runs continuously. Temperature too cold	Faulty defrost thermostat	► Check thermostat. Replace if necessary
Noisy operation	Loose flooring or floor not firm	► Repair floor or brace floor.
	Unit not level	► Properly level unit
	Tubing in contact with cabinet, other tubing, or other metal	► Adjust tubing
	Drain pan vibrating	► Adjust drain pan
	Fan hitting another part	► Ensure fan properly aligned and all attaching hardware and brackets are tight and not worn. Tighten or replace
	Worn fan motor bearings	► Check motor for loss of lubricant or worn bearings. Replace if necessary
	Compressor mounting grommets worn or missing. Mounting hardware loose or missing	► Tighten hardware. Replace grommets if necessary
	Free or loose parts causing or allowing noise during operation	► Inspect unit for parts that may have worked free or loose or missing screws. Repair as required

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5.1 Main Control Testing

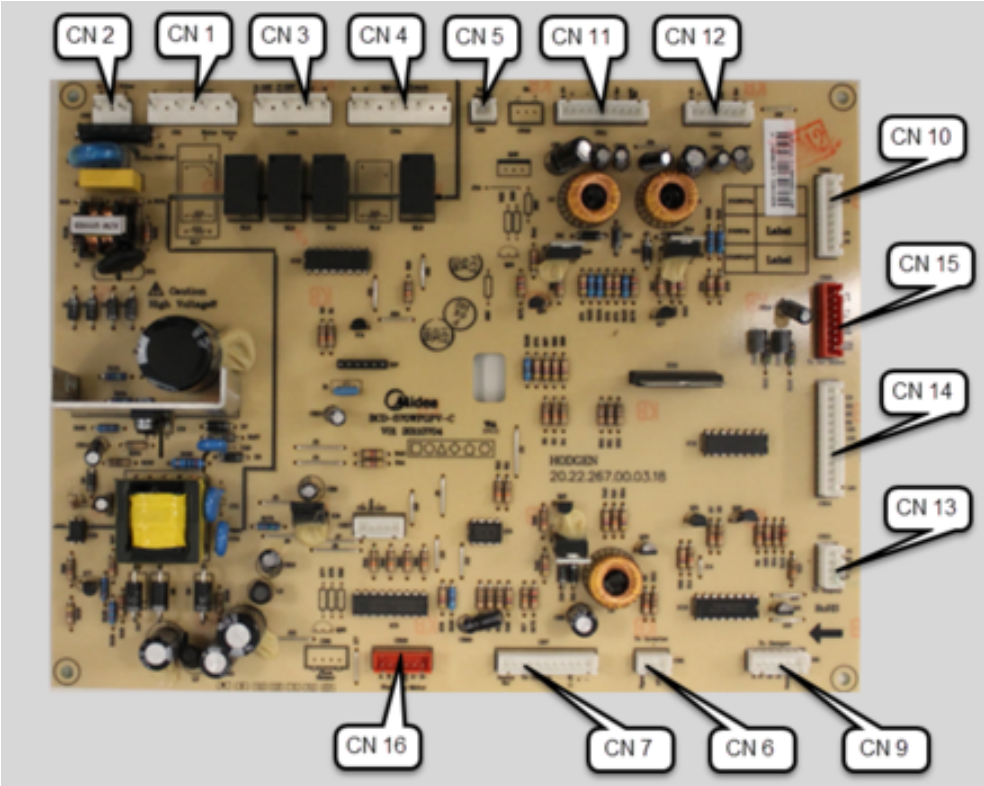

Fig. 14: ***Main Control Board***

2	CN 2 to EMI filter	15	CN 15 to ice maker controls
1	CN 1 to ice maker water valve	14	CN 14 to cavity LED lights
3	CN 3 to defrost heaters	13	CN 13 to display
4	CN 4to mullion heater	9	CN 9 to damper
5	CN 5 to water inlet heater	6	CN 6 to inverter board
11	CN 11 to refrigerator sensors	7	CN 7 to crisper controls
12	CN 12 to freezer sensors	16	CN 16 to stepping motor
10	CN 10 to door switches		

The following test procedures are applicable for both the B21CL80SNS and the B21CL81SNS unless stated otherwise. The voltage measurements listed are indications of normal main board operation.

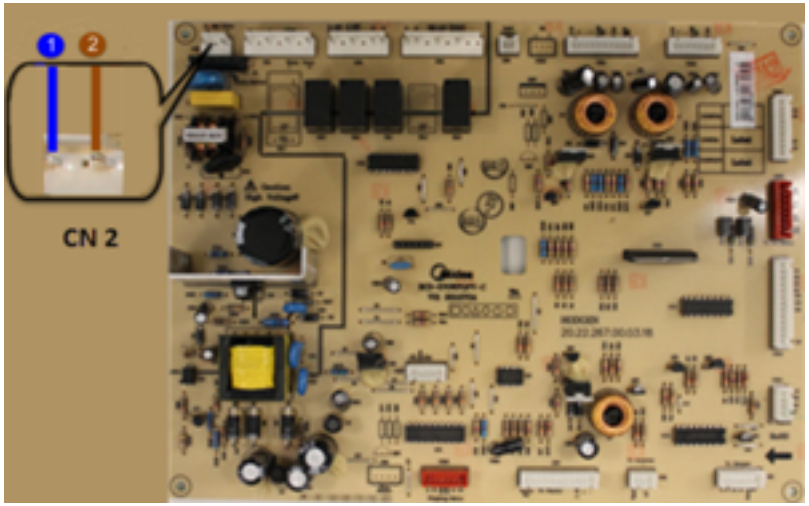

Fig. 15: ***CN 2 Connector — To Filter***

The incoming power supply to the board should be 115-120 VAC measured across pin 1 (blue) and pin 2 (brown) of connector CN 2.

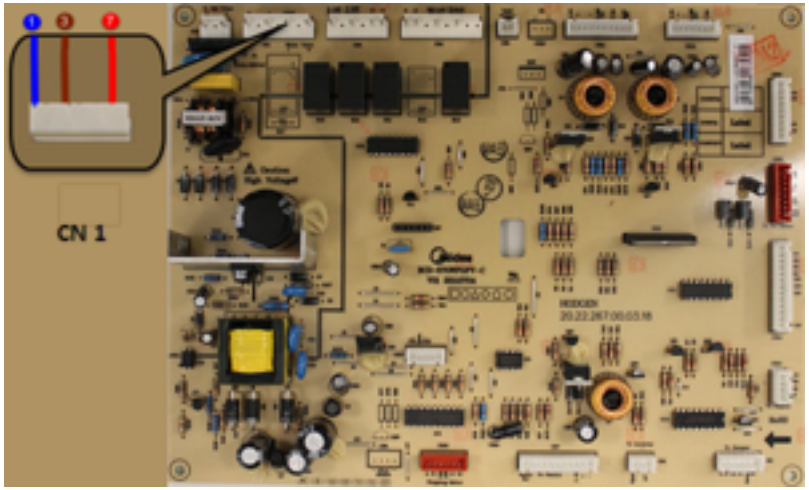

Fig. 16: ***CN 1 Connector — Water Valve***

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To initiate ice maker operation on the B21CL80SNS open both the refrigerator and freezer doors then press and hold "ice maker" button and "child lock" button for 3 seconds. "Ice maker button" will blink and a short "beep" will be heard. 115-120 VAC will be present across pin 1 (blue) and pin 3 (drk brown) of connector CN 1.

The ice maker will cycle twice and the water valve will be energized for 6.5 seconds. 115-120 VAC will be present across pin 1 (blue) and pin 7 (red) of CN 1 connector

To initiate ice maker operation on the B21CL81SNS open both the refrigerator and freezer doors then press and hold "ice maker" button and "fridge temp +" button for 3 seconds. "Ice maker" button will blink and a short "beep" will be heard. 115-120 VAC will be present across pin 1 (blue) and pin 3 (drk brown) of connector CN 1.

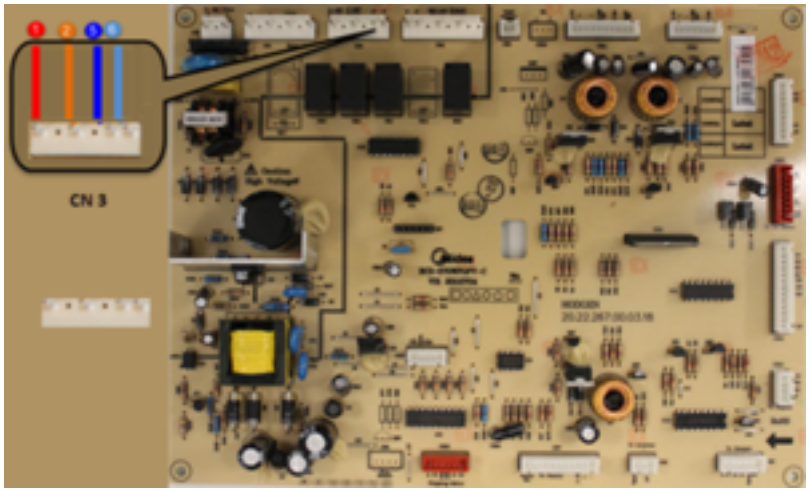

Fig. 17: ***CN 3 — Defrost Heaters***

To test the defrost heater operation initiate the forced defrost mode by pressing "fridge temp" and "freezer temp" buttons simultaneously for 3 seconds until a "beep" is heard, then release both buttons and then press "freezer temp" 3 times. A 3 will show in the display. The defrost mode will be initiated for 30 seconds

The refrigerator defrost heater circuit can be measured at pin 1 (red) and pin 5 (blue) or pin 6 (lt blue) normal reading 115-120 VAC.

The freezer defrost heater circuit can be measured at pin 3 (orange) and pin 5 (blue) or pin 6 (lt blue) normal reading 115-120 VAC.

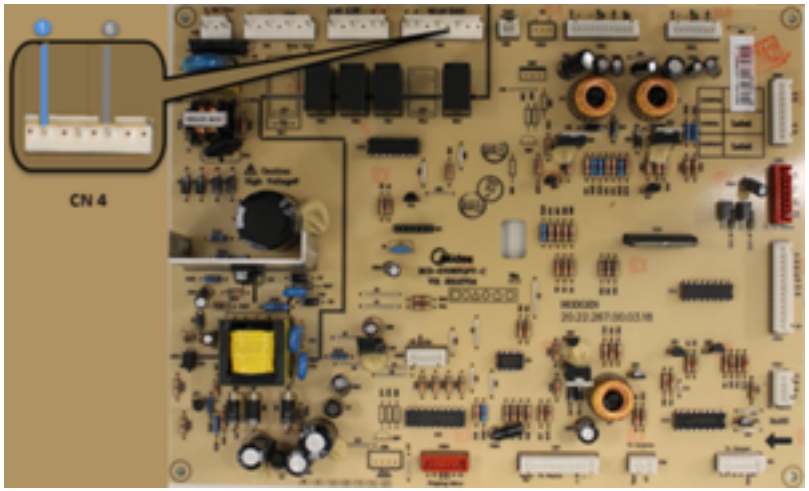

Fig. 18: ***CN 4 — Middle Defrost Heaterr***

To test the middle defrost heater circuit initiate the forced defrost mode as indicated in previous step.

Normal voltage reading across pin 1 (lt blue) and pin 6 (grey) should be 115-120 VAC.

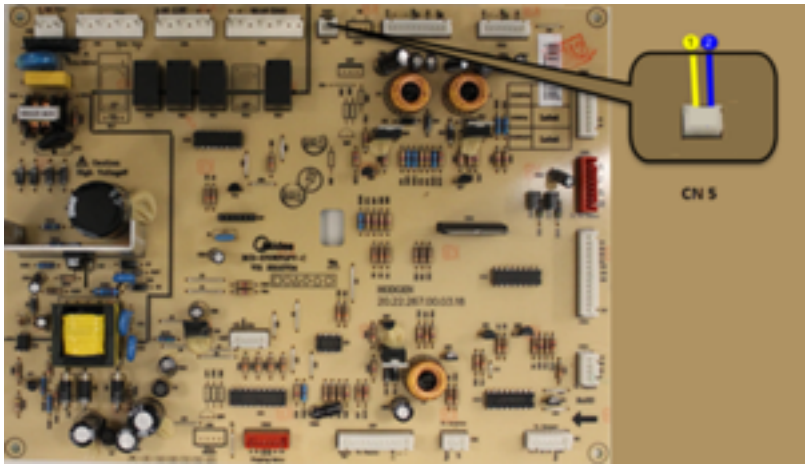

Fig. 19: ***CN 5 — Ice Fill Tube Heater***

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To check the fill tube heater circuit initiate the ice maker operation as in previous tests. .

To initiate ice maker operation on the B21CL80SNS open both the refrigerator and freezer doors then press and hold "ice maker" button and "child lock" button for 3 seconds. "Ice maker button" will blink and a short "beep" will be heard

To initiate ice maker operation on the B21CL81SNS open both the refrigerator and freezer doors then press and hold "ice maker" button and "fridge temp +" button for 3 seconds. "Ice maker" button will blink and a short "beep" will be heard.

In both models the circuit is operational if 11-12 VDC is measured between "ground" and pin 2 (blue) and 1 VDC is measured across pin 1 (yellow) and pin 2 (blue).

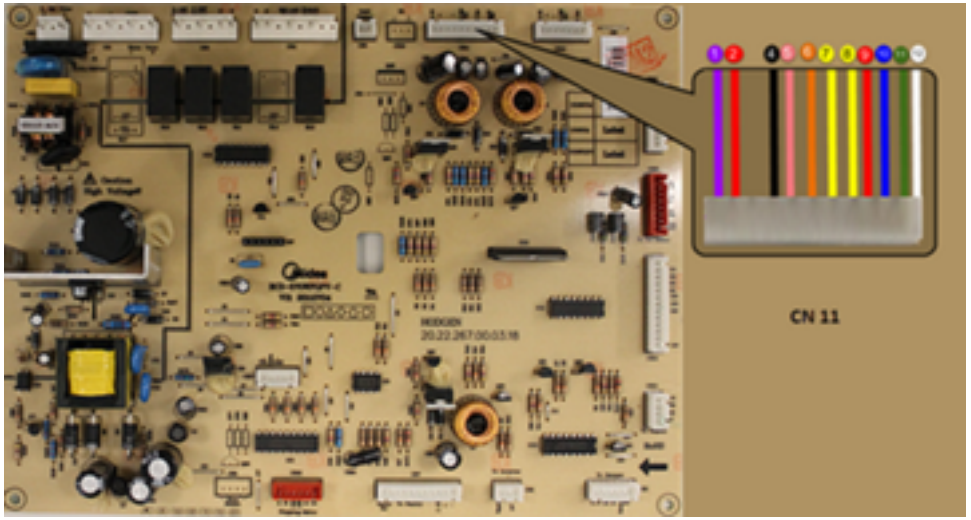

Fig. 20: ***CN 11 — Refrigerator Defrost Sensors and Evaporator Fan***

To test evaporator fan in the refrigerator compartment measure voltage across pin 2 (red) and pin 4 (black) when fan is running. the voltage should be > 9 VDC

Check resistance of the refrigerator sensor circuits with the connector removed. refer to "Sensor Data chart" for values at given ambient temperatures (see table 8; next section)Table 8 (Page 24)

REFRIGERATOR DEFROST SENSOR - Pin 6 and pin 12; **REFRIGERATOR COMPARTMENT SENSOR** - Pin 8 and pin12; **AMBIENT SENSOR** - Pin 10 and pin 12; **HUMIDITY SENSOR** - Pin 11 and pin 12.

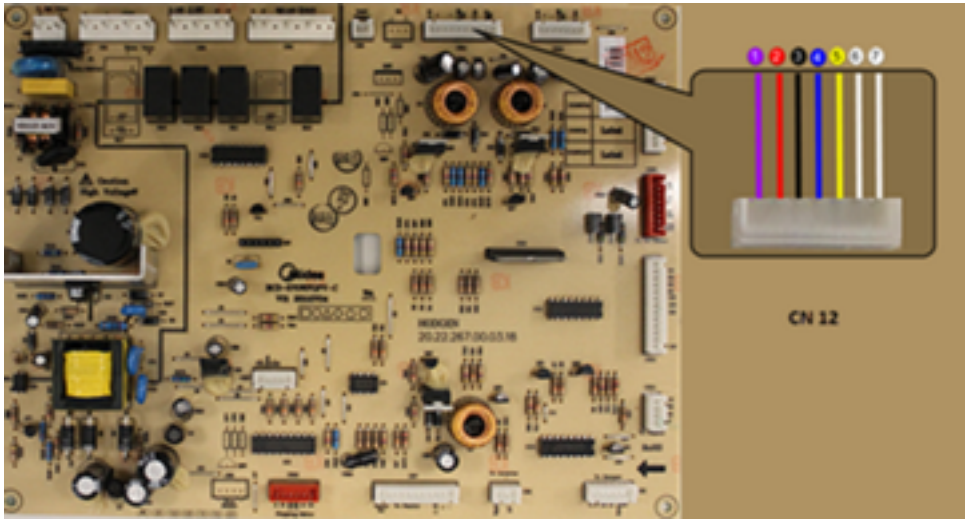

Fig. 21: ***CN 12 — Freezer Defrost Sensors***

To test evaporator fan in the freezer compartment measure voltage across pin 1 (purple) and pin 2 (red) when fan is running. the voltage should be > 9 VDC

Check resistance of the freezer sensor circuits with the connector removed. refer to "Sensor Data chart" for values at given ambient temperatures (see table 8; next sectionTable 8 (Page 24)

FREEZER COMPARTMENT SENSOR - Pin 6 (white) and pin 7 (white). **FREEZER DEFROST SENSOR** - Pin 4 (blue) and pin 5 (yellow)

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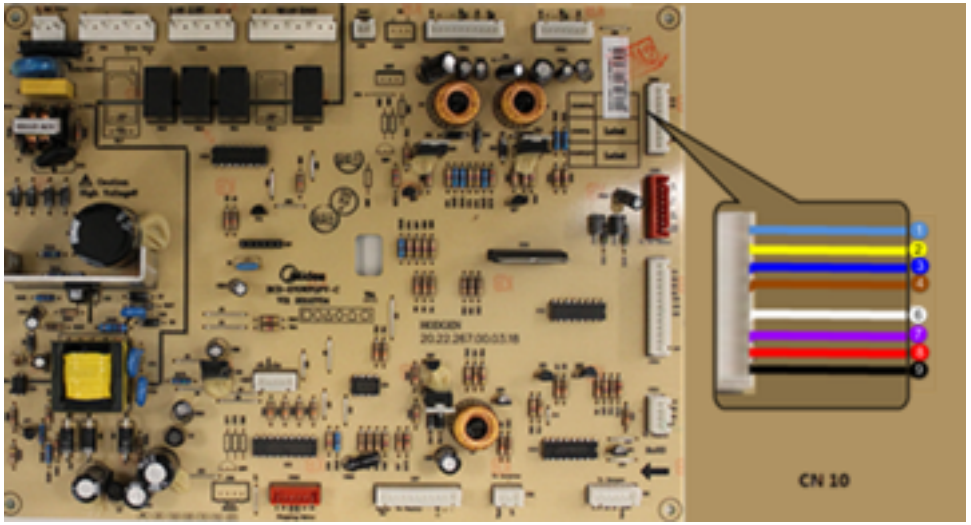

Fig. 22: ***CN 10 — Door Switches***

Checking the door switch circuits is accomplished by starting with all doors closed. Check voltage from ground to pin 1 (lt blue); 3 (blue); 6 (purple) or 8 (red) should be 0-1 VDC.

Check voltage from ground to pin 2 (yellow) and open the upper freezer compartment door, the value should be 0-1 VDC, close the door and the value should be 5 VDC.

Check voltage from ground to pin 4 (brown) and open the lower freezer compartment door, the value should be 0-1 VDC, close the door and the value should be 5 VDC.

Check voltage from ground to pin 7 (purple) and open the left refrigerator door, the value should be 0-1 VDC, close the door and the value should be 5 VDC.

Check voltage from ground to pin 9 (purple) and open the right refrigerator door, the value should be 0-1 VDC, close the door and the value should be 5 VDC

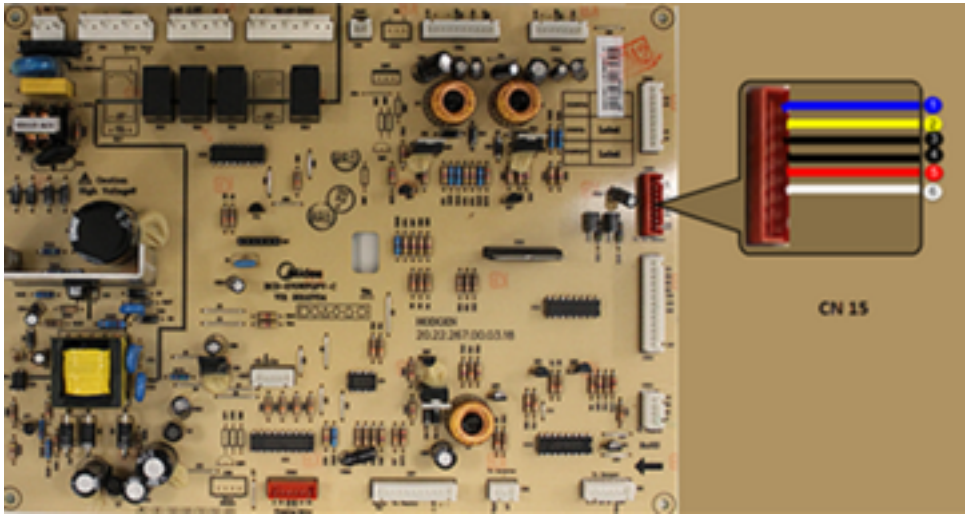

Fig. 23: ***CN 15 — Ice Maker***

To test the controls of the ice maker initiate the ice maker operation as indicated in instructions for connection CN 1 above. The voltage test will be the same for both the B21CL80SNS and B21CL81SNS.

Check voltage from pin 2 (yellow)(GND) and pin 1 (blue) value will be 5 VDC when ice maker cycle is running and 1 VDC when the cycle is off.

Check voltage from pin 2 (Yellow)(GND) and either pin 5 (red) or pin 6 (white) value will be 11-12 VDC when ice maker cycle is running and 0-1 VDC when the cycle is off.

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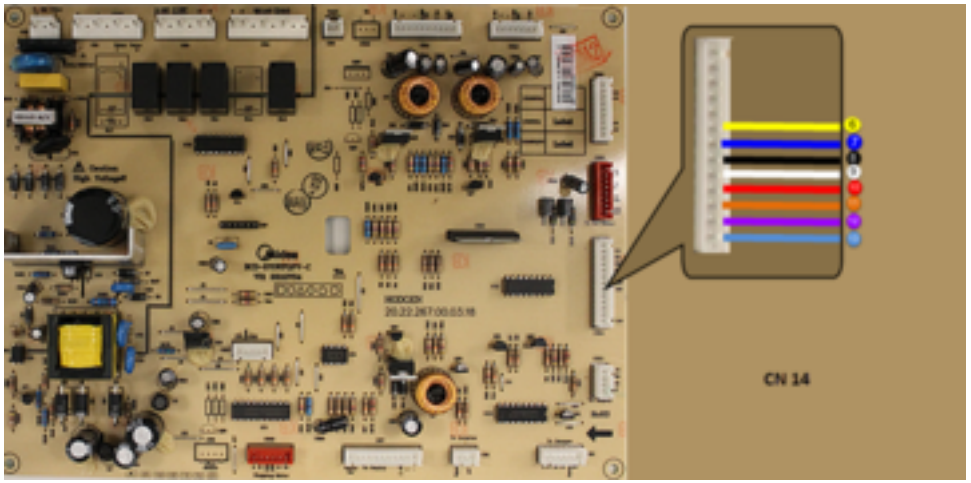

Fig. 24: ***CN 14 — Cavity Lighting***

To check the cavity lighting circuits measure voltage from ground to pin 9 (white) or 10 (red) or 11 (orange) or 12 (purple) the value should be 11-12 VDC.

Pins 6 (yellow), 7 (blue) and 8 (black) are interconnected and control the refrigeration light. To test the circuit measure the voltage from pin 9 (white) and any of 6 (yellow), 7 (blue) and 8 (black) the value will be > 10 VDC when lights are energized and < 9 VDC when lights are off.

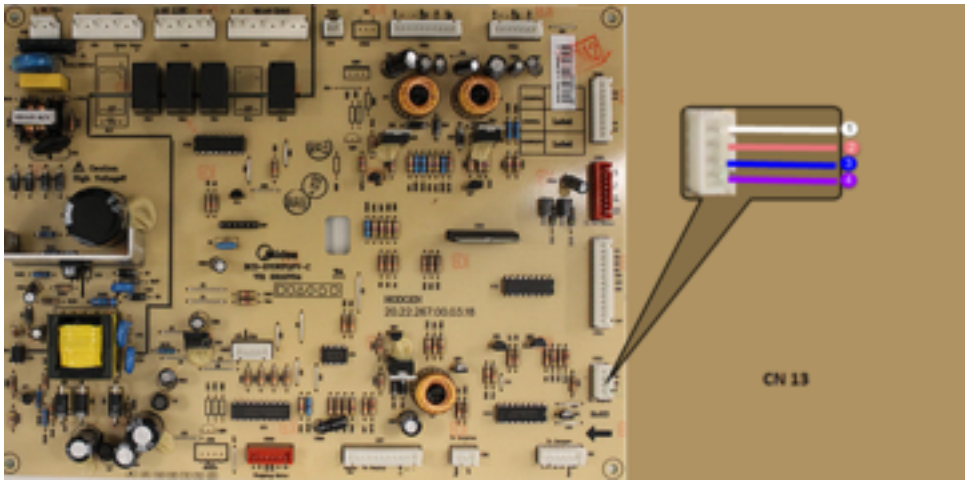

Fig. 25: ***CN 13 — Display PCB***

Check the voltage to the display from pin 3 (blue) and pin 4 (purple) should be 12 VDC

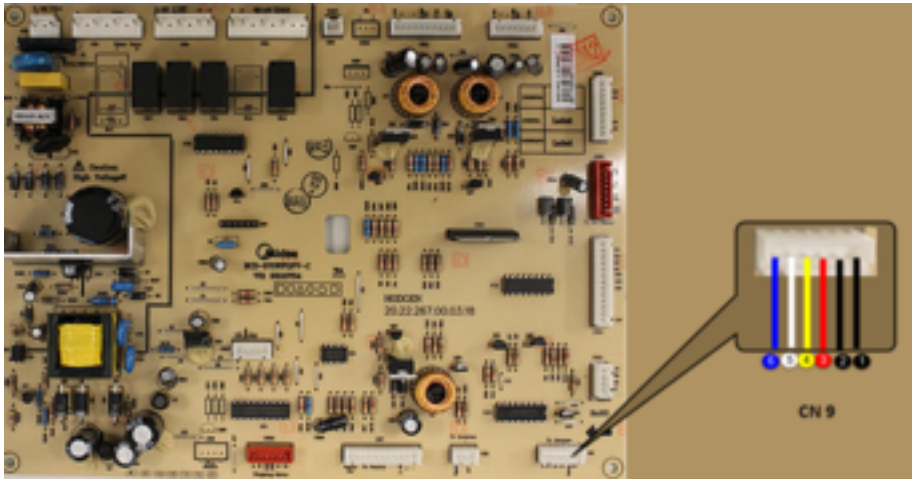

Fig. 26: ***CN 9 — Damper***

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To check the damper circuit check voltage from pin 1 (black) and pin 2 (black) during damper operation. These two pins control the damper heater which is energized when damper is operational.

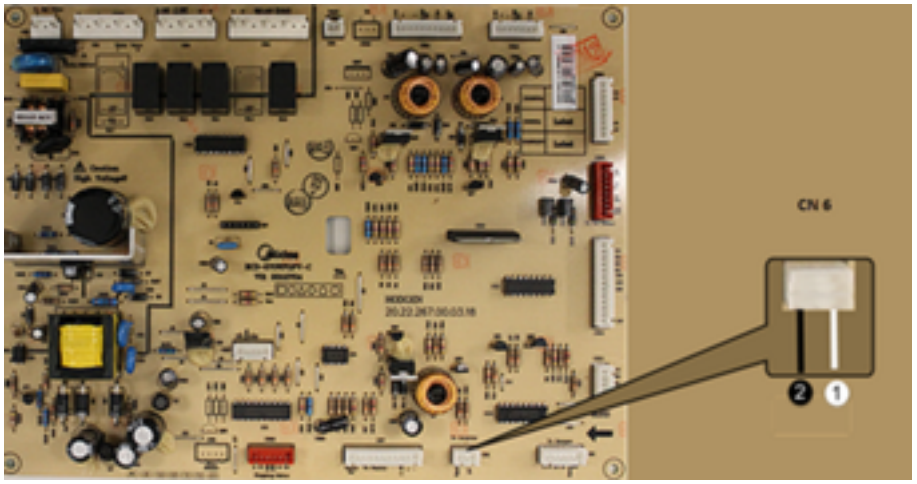

Fig. 27: ***CN 6 — To Inverter***

When the temperature in the refrigerator or freezer compartment raises enough to call for cooling, a signal is sent from connector CN 6 to the inverter board. During the cooling function 11-12 VDC should be read from ground to pin 1 (white) and 5-7 VDC from ground to pin 3 (black).

If the unit is not in a cooling mode, lower the set temperature by 3-4°F, as indicated in Fig. 11; page 14

NOTE:

If a cooling cycle has just ended, allow the unit to stand idle for at 10 minutes to allow the pressures in the sealed system to equalize, if not damage to the compressor is possible.

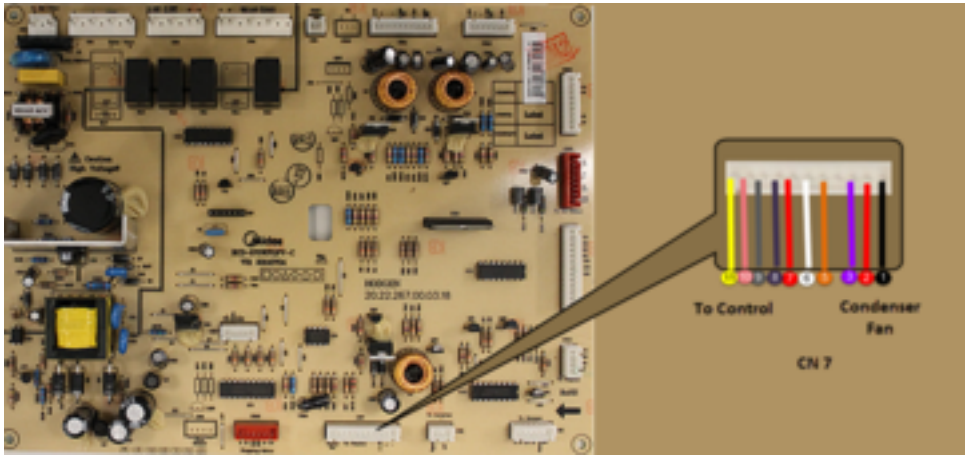

Fig. 28: ***CN 7 — Control Board and Condenser Fan***

To check the condenser fan measure voltage from pin 1 (black) and pin 3 (purple) when the fan is operating.

The condenser fan is powered anytime the compressor is operating.

If the unit is not in a cooling mode, lower the set temperature by 3-4°F, as indicated in Fig. 11; page 14

NOTE:

If a cooling cycle has just ended, allow the unit to stand idle for at 10 minutes to allow the pressures in the sealed system to equalize, if not damage to the compressor is possible

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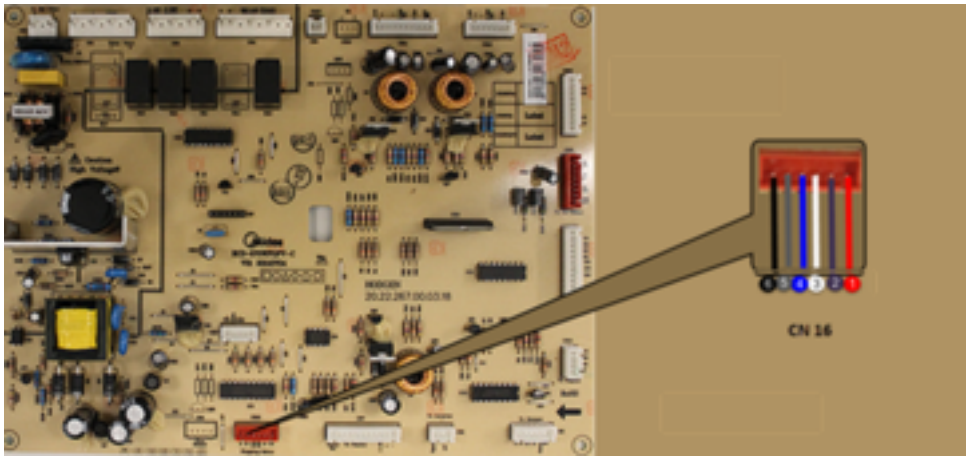

Fig. 29: ***CN 16 — Electric Switching Valve***

The electric switching valve circuit is operational if 11-12 VDC is measured from pin 3 (white) and pin 4 (blue)

	DANGER **Exposed, live components!** Death from electric shock. ► Disconnect the appliance from the power supply. ► Do not touch housing, frame or components. ► If running tests while the power is on, always use a residual current circuit-breaker. ► Ensure that the resistance of the protective conductor does not exceed the standardised value.

►

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5.2 Sensor Data Chart

Temperature °C	Sensor Ω	Total Ω - W/ Lead	Input Voltage
-3	7.568	12.668	2.01
-2	7.19	12.29	2.07
-1	6.833	11.933	2.14
0	6.495	11.595	2.20
1	6.175	11.275	2.26
2	5.873	10.973	2.32
3	5.587	10.687	2.39
4	5.316	10.416	2.45
5	5.06	10.16	2.51
6	4.818	9.918	2.57
7	4.589	93689	2.63
8	4.372	9.472	2.69
9	4.167	9.267	2.75
10	3.972	9.072	2.81
11	3.788	8.888	2.87
12	3.613	8.713	2.93
13	3.447	8.547	2.98
14	3.29	8.39	3.04
15	3.141	8.241	3.09
16	2.999	8.099	3.15
17	2.865	7.965	3.20
18	2.737	7.837	3.25
19	2.616	7.716	3.30
20	2.501	7.601	3.35
21	2.391	7.491	3.40
22	2.287	7.387	3.45
23	2.188	7.288	3.50
24	2.094	7.194	3.54
25	2.005	7.105	3.59
26	1.919	7.019	3.63
27	1.838	6.938	3.68

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28	1.761	6.861	3.72
29	1.687	6.787	3.76
30	1.617	6.717	3.80
31	1.55	6.65	3.83
32	1.486	6.586	3.87
33	1.426	6.526	3.91
34	1.368	6.468	3.94
35	1.312	6.412	3.98
36	1.259	6.359	4.01
37	1.209	6.309	4.04
38	1.161	6.261	4.07
39	1.115	6.215	4.10
40	1.071	6.171	4.13
41	1.029	6.129	4.16
42	0.989	6.089	4.19
43	0.951	6.051	4.21
44	0.914	6.014	4.24
45	0.879	5.9789	4.26
46	0.845	5.9454	4.29
47	0.813	5.9133	4.31
48	0.783	5.8826	4.33
49	0.753	5.8532	4.36
50	0.725	5.8251	4.38

Table 8:

►

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5.3 Ice Maker Manual Operation; Internal Display

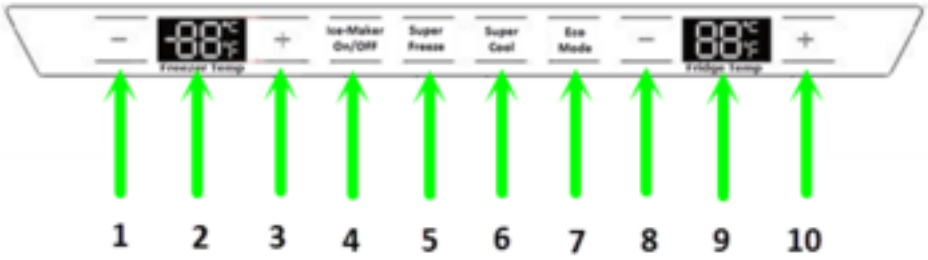

Fig. 30: ***Display Lay Out***

1	Freezer temperature decrease button	5	“Super cool” button
2	Freezer temperature increase button	6	“ECO” button
3	“On/OFF button”	7	Refrigerator temperature decrease button
4	“Super freeze” button	8	Refrigerator temperature increase button

Make certain ice maker is not full of ice, open all doors.

Press and hold the "Ice maker On/OFF" button (3) and the "Fridge temp increase" button (8) for 3 seconds.

The "Ice maker" button will blink and there will be an audible tone.

The ice maker will cycle twice and then the water valve will activate for 6.5 seconds.

When the water valve stops filling the ice maker returns to normal operation.

► test

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6.1 Remove/Replace Ice maker

Fig. 31: ***Ice Maker Location***

The ice maker is mounted to the roof of the freezer section, left hand side.

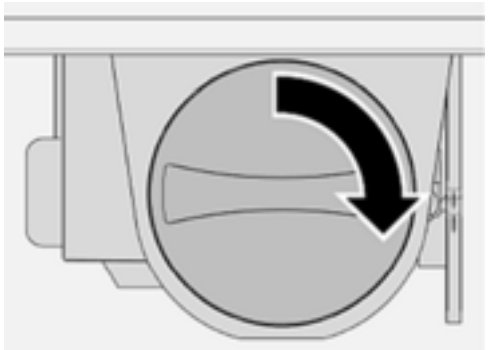

Fig. 32: ***Ice Cube Tray Handle, locked Position***

To remove the ice tray rotate the handle 90° to a vertical position.

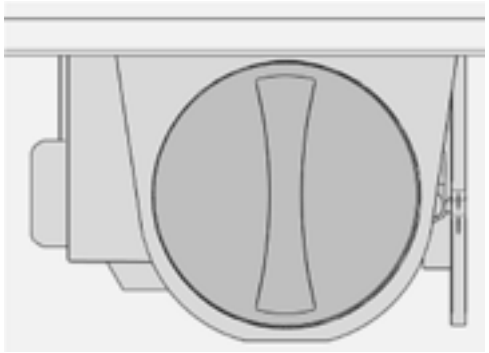

Fig. 33: ***Ice Cube Tray Handle, Unlocked***

The ice maker tray handle is in the unlocked position when it is in a vertical position.

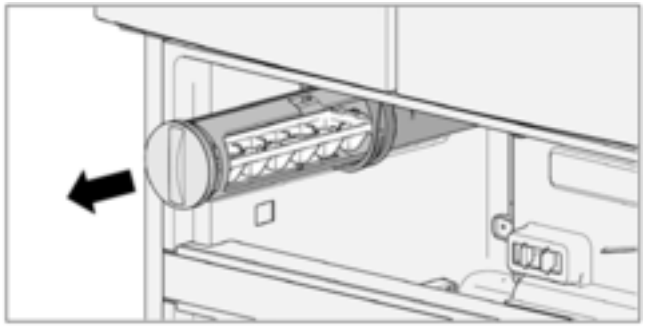

Fig. 34: ***Remove Ice Cube Tray***

	The ice tray is keyed at the rear and will only go back in one way.

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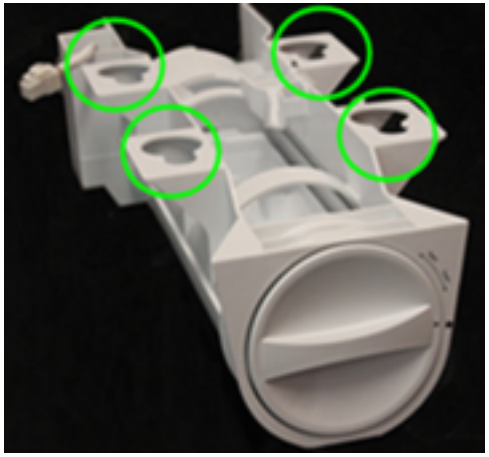

Fig. 35: ***Ice maker Mounting Bracket***

The ice maker is secured to the roof of the freezer compartment by four studs mounted to the unit and the bracket that is included with the ice maker.

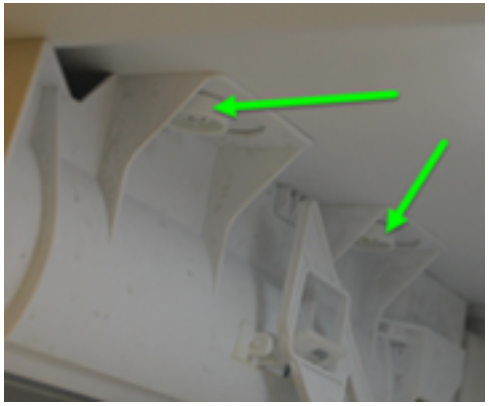

Fig. 36: ***Ice Maker Mounting Studs***

Fig. 37: ***Removing Ice Maker***

To remove the ice maker, grasp firmly and pull the assembly forward.

Fig. 38: ***Removing Ice maker Assembly from Freezer***

The ice maker assembly is connected to the electronics by a cable harness that is located in the roof, left rear corner.

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Fig. 39: ***Ice Maker Cable Harness Connection Point***

This cable harness needs to be disconnected prior to removing the ice maker assembly

	Replace the ice maker if necessary, follow the preceding steps in reverse to complete the repair. The ice maker is only serviceable as a complete assembly

►

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6.2 Display Removal / Replacement

Fig. 40: ***Remove Display Mounting Screws***

Remove two screws that secure display to roof of refrigeration compartment.

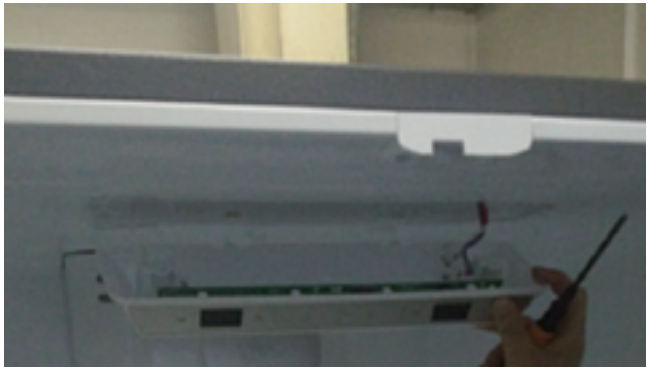

Fig. 41: ***Detach Display Assembly***

Detach the display/control assembly from the roof of the refrigeration compartment, remove wire connectors.

Fig. 42: ***Removing Key Pad***

Using a putty knife or like tool, remove and set aside key pad.

Fig. 43: ***Remove Control Screws***

Remove the two screws that secure the control board to the display housing.

Fig. 44: ***Remove Display/Control Assembly***

Detach and remove display/control assembly from display housing.

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Fig. 45: ***Remove Transparent Cover***

Remove the fastener around the transparent cover of the display/control assembly using flat blade screwdriver

Remove and set aside the transparent cover

Fig. 46: ***Remove LED Light Panel***

Release the fastener around the LED light panel, then detach and remove LED light panel.

►

Result:
To re-assemble and or replace display/control assembly or LED light panel, perform the preceding steps in reverse.

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6.3 Remove/Replace Control Board

The main control board and the frequency filter are located on the rear left side of the unit protected by a cover.

Fig. 47: ***Control Board Cover***

Disconnect power or unplug power cord from the outlet.

To access and/or replace the main control or the frequency filter remove the screws (4) that secure the cover to the back of the unit.

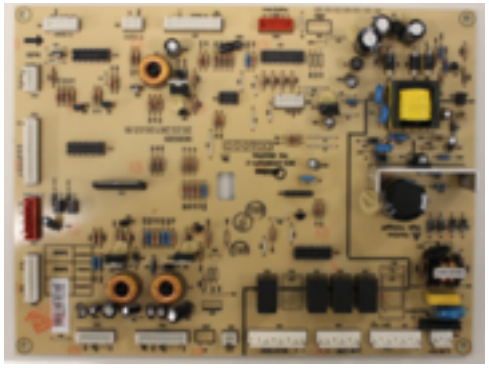

Fig. 48: ***Main Control Board***

Fig. 49: ***Frequency Filter***

Both of the boards are secured by quick release tabs.

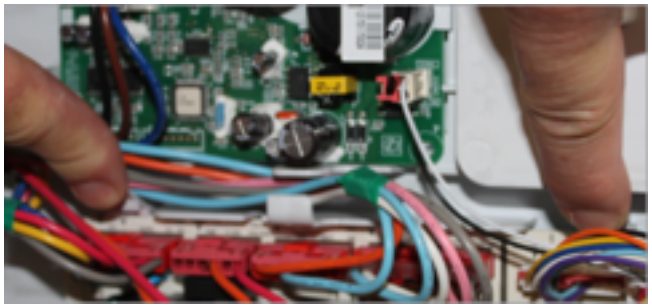

Fig. 50: ***Control Board Release Tabs***

Push the release tabs away from the board to remove the part from the unit. Disconnect all cable harnesses, label if necessary to ensure proper re-connection.

Restore power to the unit and test for proper operation.

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6.4 Repair/Replace Mullion Heater Assembly

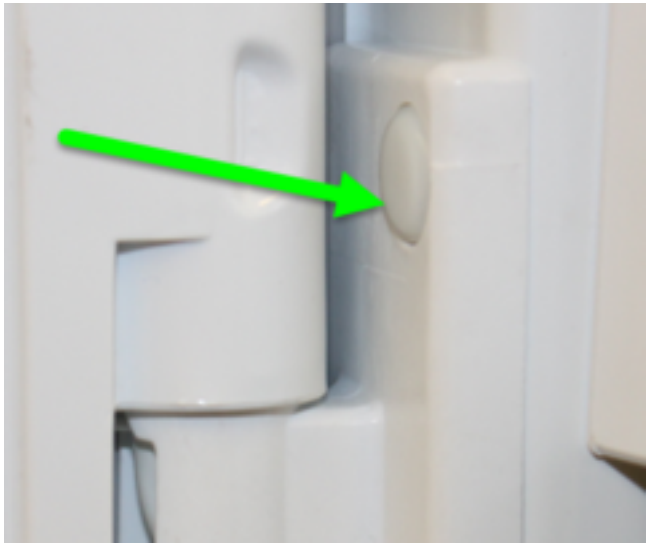

Fig. 51: ***Mullion Heater Screw Caps***

With a small pocket sized flat blade screwdriver, or similar tool, remove the decorative caps that cover the screws that secure the mullion heater assembly mounting brackets.

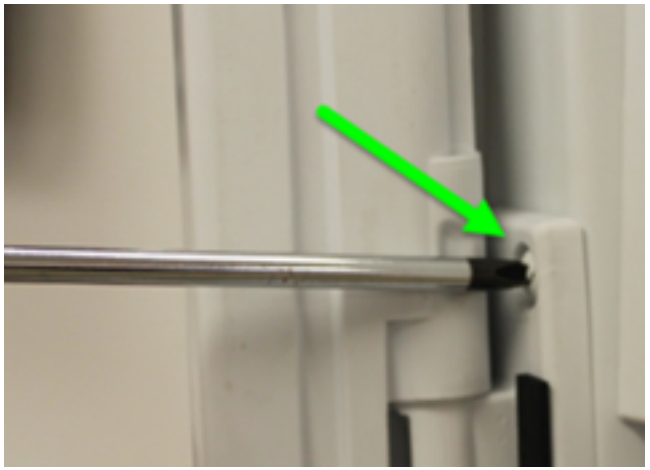

Fig. 52: ***Mullion Heater Assembly Screws***

Remove the mullion heater assembly screws to release the bracket from the door.

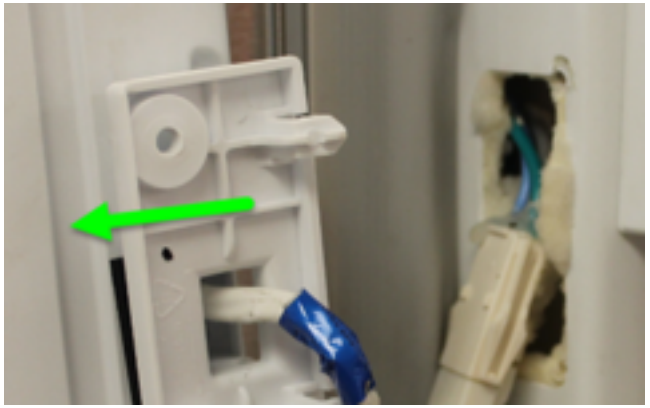

Fig. 53: ***Retract Bracket Assembly***

Pull the bracket assembly back towards the mullion heater assembly, lift the heater assembly up and away from the lower mounting bracket on the door.

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Fig. 54: ***Mullion Heater Lower Mounting Bracket***

Fig. 55: ***Disconnect Cable Harness***

Disconnect cable harness from door wire harness and remove the mullion heater assembly. repair or replace the assembly as necessary.

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6.5 Refrigerator Door and Door Switch Removal

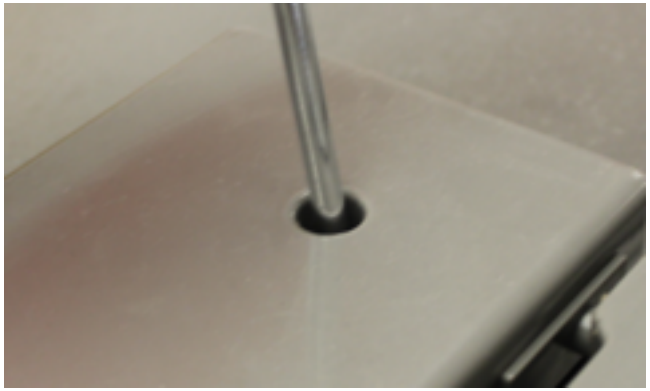

Fig. 56: ***Hinge Cover Screws***

To remove the refrigerator door, first remove the 2 screws that secure the hinge cover to the top of the unit.

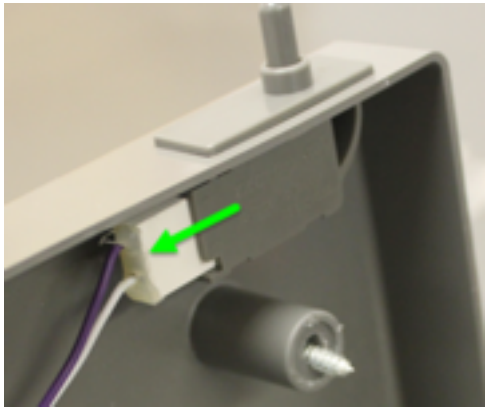

Fig. 57: ***Hinge Wire Connections***

Lift up the hinge cover and disconnect the wire connectors from the cover. Remove the cover and set aside.

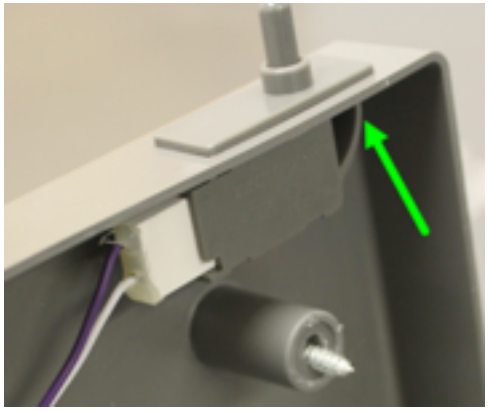

Fig. 58: ***Door Switch Removal***

To remove or replace the door switch depress the bracket that holds the switch to the hinge cover and lift the switch out of the cover.

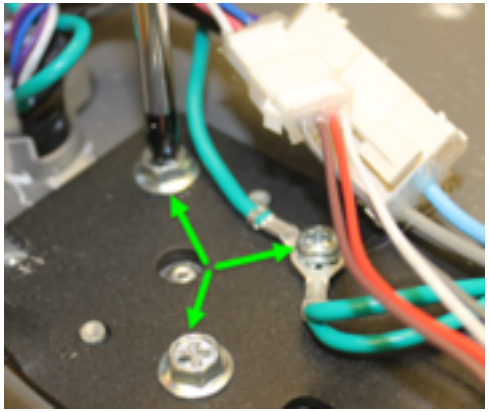

Fig. 59: ***Hinge Screws***

While supporting the door, remove the 2 hinge screws and the grounding screw and carefully lift the door off of the lower hinge, be sure to save any washers or bearings from the bottom, and place door on a protected surface.

This procedure is applicable for either right or left hand refrigerator doors.

►

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6.6 Leveling Refrigerator Doors

Fig. 60: ***Doors Not Level***

If the doors are uneven at the top, follow the below steps to correct and level.

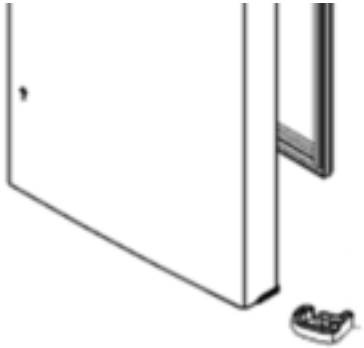

Fig. 61: ***Remove Lower Hinge Cover***

1. Remove lower hinge cover.

Fig. 62: ***Door Leveling Shims***

Locate the door shims (4) included in the install parts bag with the User manual. Lift the door slightly to allow the insertion of a shim below the door.

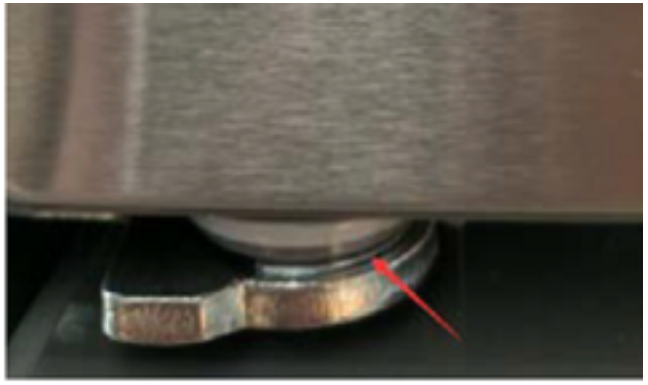

Fig. 63: ***Door Leveling Shim Installed***

If there is not enough movement in the door to allow the shim to be installed, it may be necessary to loosen or remove the upper hinge of the door being leveled. See removing refrigerator door section.

►

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6.7 Remove/Replace Humidity Sensor

The humidity sensor is located under the right hand hinge cover

Fig. 64: ***Right Hand Upper Hinge Cover***

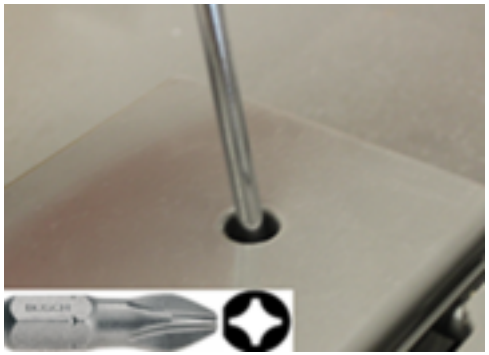

Fig. 65: ***Right Hand hinge Cover Screws (2)***

Remove the hinge cover screws (2). Lift the cover up to access the underside.

Fig. 66: ***Humidity Sensor***

The humidity sensor is secured to the underside of the right hand upper hinge cover, after removing the cover the sensor can be removed or replaced.

►

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6.8 Repair/Replace air Duct Assembly

Fig. 67: ***Remove freezers Basket***

Open the freezer drawer and lift out the freezer basket, set aside on a protected surface.

Fig. 68: ***Depress Freezer Drawer Rail Locks***

Depress the drawer rail locks on either side of the drawer. Remove drawer and set aside on a protected surface.

Fig. 69: ***Freezer Drawer Removed***

When drawer is removed take care not to damage the rails or the drawer may not reinstall properly.

Fig. 70: ***Air Duct Screws***

Remove the four air duct screws that secure the assembly to the inside back of the freezer compartment.

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Fig. 71: ***Air Duct Fan Assembly Cable Harness Connection***

Fig. 72: ***Freezer Air Duct Assembly***

►

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6.9 Remove/Replace Freezer Evaporator Fan

Fig. 73: ***Freezer Evaporator Cover Screws***

Remove the freezer drawer as described in previous steps

Remove the screws (4) that secure the evaporator cover to the back wall. Using a slotted screwdriver or similar tool, depress the clips at the bottom of the cover, and pull the cover away from the wall and drop it down to expose the cable harness connection at the top right corner.

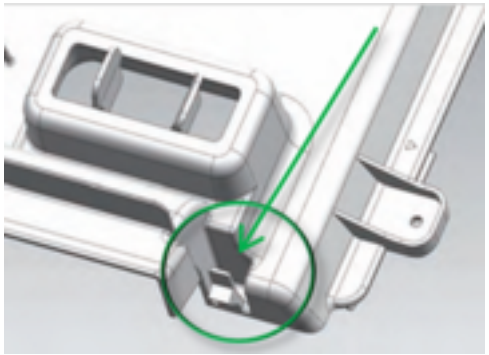

Fig. 74: ***Evaporator Cover Locking Clips***

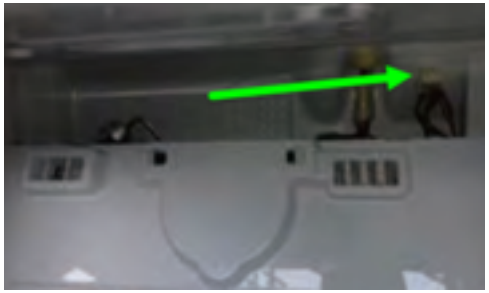

Fig. 75: ***Freezer Evaporator Cover Cable Harness Connector***

Pull the cover out of the freezer and place it on a protected surface.

Fig. 76: ***Freezer Fan Cover***

Using a small slotted screwdriver or similar tool, release the clips that hold the inner fan cover in place

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Fig. 77: ***Inner Fan Cover***

Pull the inner fan cover away from the assembly and set aside.

Fig. 78: ***Inner Aluminum Insulation Panel***

Locate the mounting tabs (4) of the aluminum insulation panel. release the tabs from the air channel cover, remove and set aside insulation panel.

Fig. 79: ***Evaporator Fan Mounting Screws (4)***

Remove the evaporator fan mounting screws (3) that secure the evaporator fan to the air duct assembly, remove and/or replace the fan as necessary.

Follow these steps in reverse to reassemble the evaporator cover. Check for functionality.

►

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6.10 Remove/Replace Refrigerator Evaporator Fan Motor

Remove all shelves and drawers from the refrigerator section

Fig. 80: ***Remove Screw Cap***

Using a slotted screwdriver or similar tool remove the upper screw cover.

Fig. 81: ***Evaporator Cover Screws (6)***

Remove the phillips head cover screws (6).

Fig. 82: ***Remove Shelf Support***

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Remove and set aside the center shelf support.

Fig. 83: ***Evaporator Cover Upper Cable Harness***

Fig. 84: ***Evaporator cover Lower Cable Harness***

Disconnect all cable harnesses for the evaporator cover.

Fig. 85: ***Rear Side of Evaporator Cover***

Invert the cover and place on a protected surface.

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Fig. 86: ***Evaporator Fan Inner Cover Screws (2)***

Fig. 87: ***Remove Inner Evaporator Cover***

Using a slotted screwdriver or similar tool pry up and remove the inner evaporator fan cover.

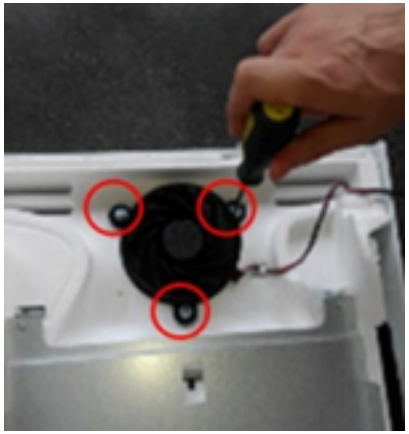

Fig. 88: ***Evaporator Fan Mounting Screws (3)***

Remove the evaporator fan mounting screws (3) remove, repair and/or replace the fan motor assembly.

Follow these steps in reverse to reassemble the evaporator fan and cover assembly.

Return unit to operation and test for proper function.

►

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6.11 Defrost Heater Replacement

Remove evaporator cover as described in previous section

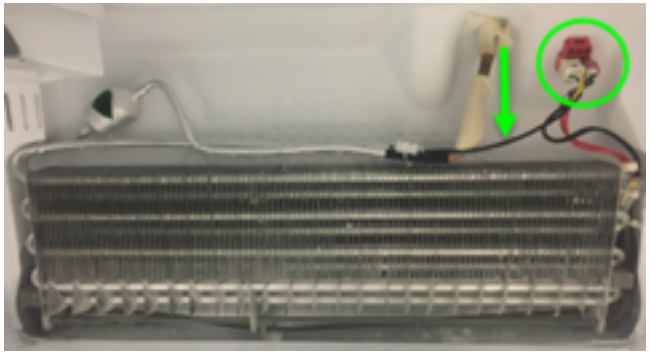

Fig. 89: ***Disconnect Heater Leads***

Disconnect the heater connector by pulling straight down.

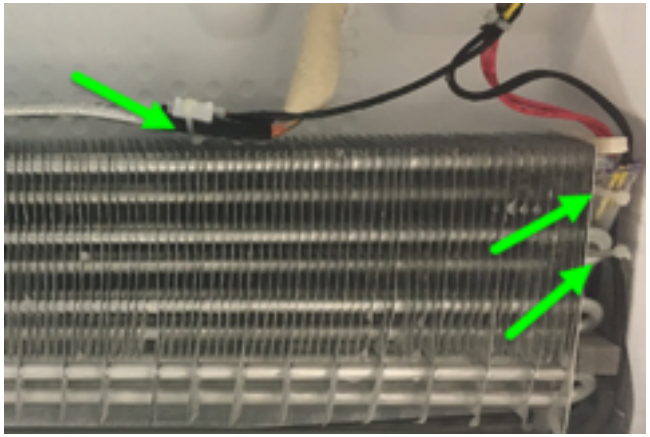

Fig. 90: ***Cut Wire Ties***

Using a scissors or similar tool cut and remove the wire ties securing the heater and wiring to the evaporator.

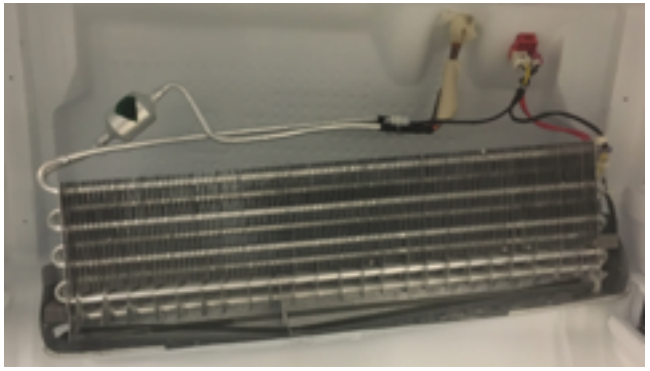

Fig. 91: ***Pull Evaporator Away From Back Wall***

Carefully pull the evaporator out away from the back wall, be careful not to damage or kink the tubing.

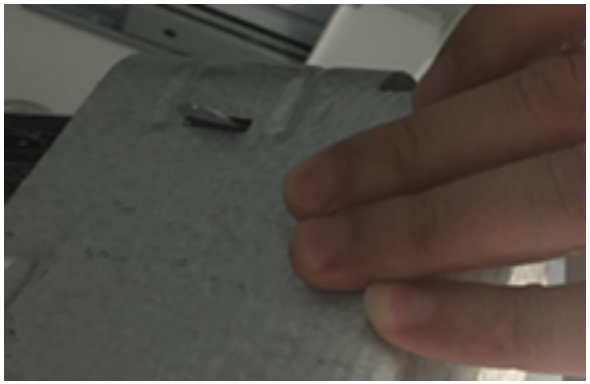

Fig. 92: ***Bottom Bracket Removal***

With a needle nose pliar, or similar tool, bend the brackets that hold the defrost heater to the evaporator. Remove the bottom bracket to gain access to the heater.

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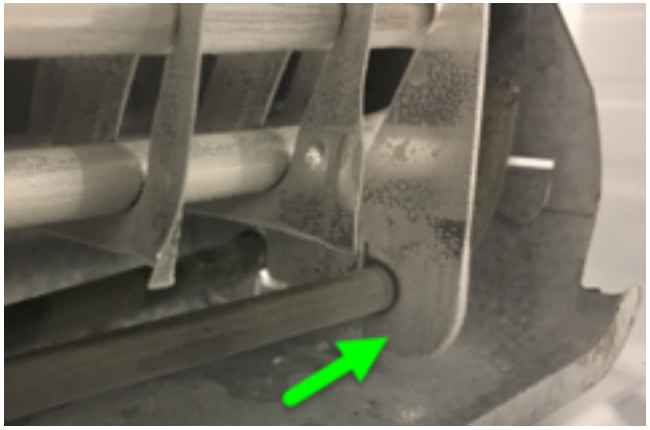

Fig. 93: ***Bend Heater Brackets***

Carefully bend the brackets securing the heater to the evaporator, be careful not to damage the evaporator or any tubing.

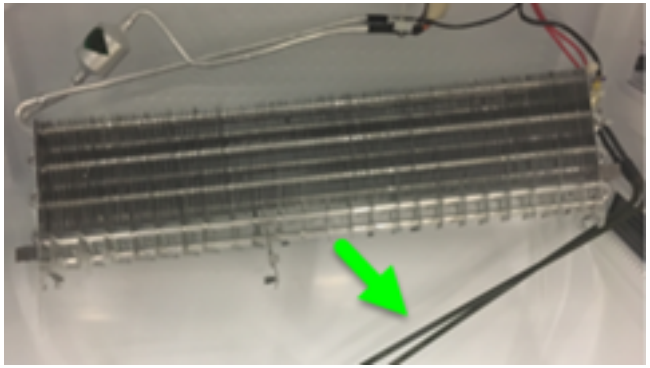

Fig. 94: ***Remove Heater***

Pull the heater out and away from the evaporator, be aware of sharp edges.

To reinstall heater follow these steps in reverse.

►

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6.12 Remove/Replace Refrigerator Defrost System Parts

Remove all shelves and drawers from the refrigerator section

Fig. 95: ***Remove Screw Cap***

Using a slotted screwdriver or similar tool remove the upper screw cover.

Fig. 96: ***Evaporator Cover Screws (6)***

Remove the phillips head cover screws (6).

Fig. 97: ***Remove Shelf Support***

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Remove and set aside the center shelf support.

Fig. 98: ***Evaporator Cover Upper Cable Harness***

Fig. 99: ***Evaporator cover Lower Cable Harness***

Disconnect all cable harnesses for the evaporator cover, and set cover aside

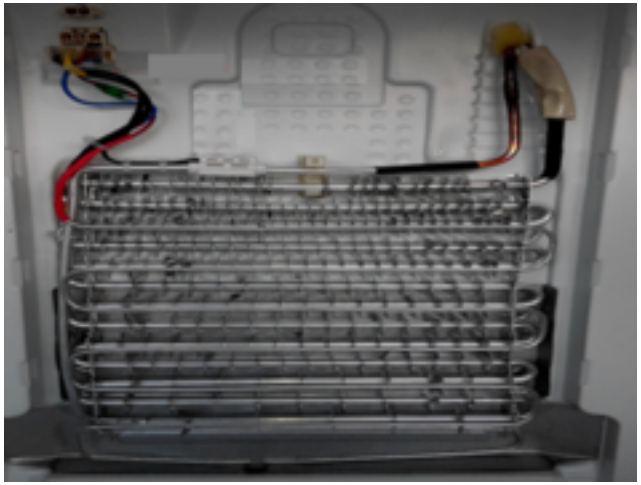

Fig. 100: ***Refrigerator Evaporator***

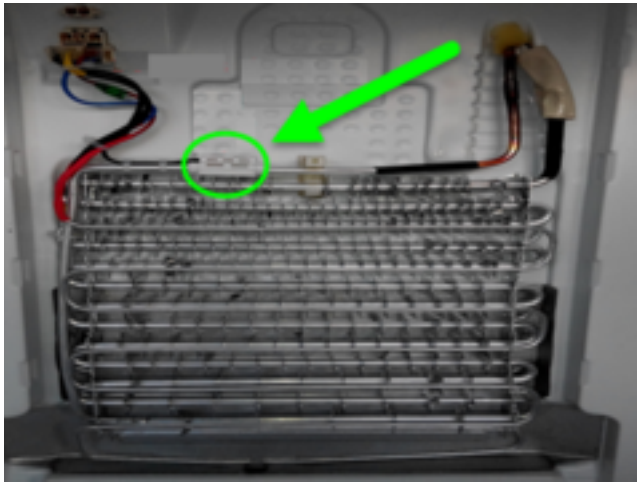

Fig. 101: ***Defrost Thermostat***

The defrost sensor is mounted to the top of the evaporator inline with the defrost heater.

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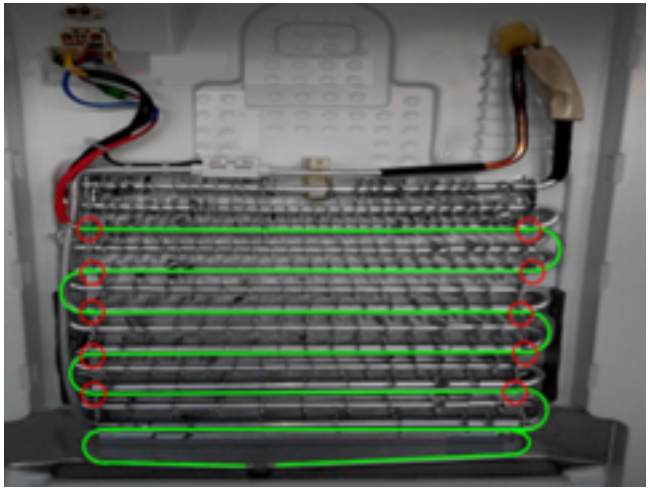

Fig. 102: ***Defrost Heater***

The defrost heater is mounted to the front of the evaporator, secured by bendable tabs (10)

To remove/replace defrost heater, bend the securing tabs(10) back out of the way to free up the heater.

Free the evaporator, be careful not to damage any tubing or solder connections. Remove and/or replace the heater element.

Follow these steps in reverse to reassemble the evaporator fan and cover assembly.

Return unit to operation and test for proper function.

►

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6.13 Repair/Replace Cavity Lighting

Fig. 103: ***Dome Light Cover Removal***

At the rear of the dome light cover in the roof of the refrigerator section, Use a flat blade screwdriver, or similar tool to carefully pry the cover from the light mounting box.

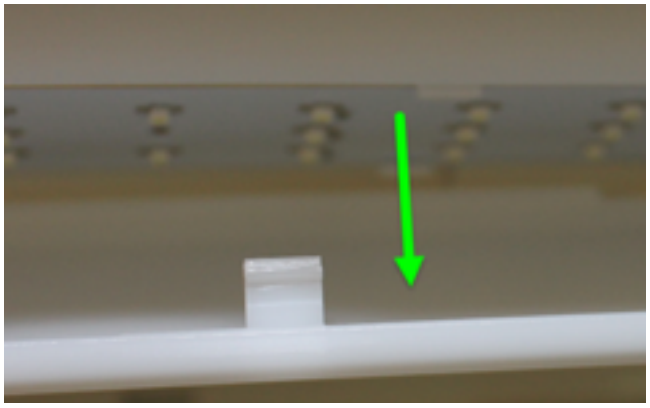

Fig. 104: ***Dome Light Cover Removal***

After release the rear portion of the dome light cover, slide it slightly to the rear and let the front catch disengage with the holder. Set the cover aside on a protected surface.

Fig. 105: ***LH Dome Light Mounting Screw***

Remove both screws, right and left, that secure the LED dome light assembly to the roof of the refrigerator, let the assembly drop down then disconnect the cable harness. Repair or replace as necessary.

Fig. 106: ***Dome Light Connector***

Pull the dome light down and disconnect the lead connector and repair or replace dome light as necessary.

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Fig. 107: ***Side LED Light Cover***

Use a flat blade screwdriver, or similar tool to remove the side LED light cover.

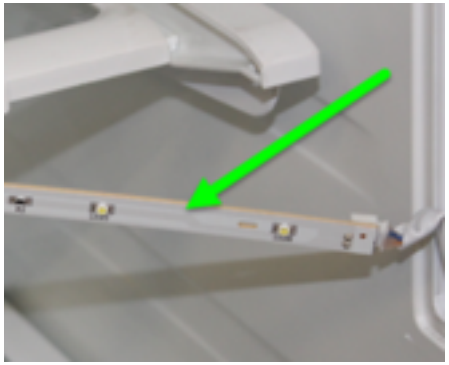

Fig. 108: ***LED Lamp Strip***

Remove LED lamp strip.

Fig. 109: ***LED Side Lamp Connector***

Disconnect the LED light strip from it's connector and repair or replace as necessary.

►

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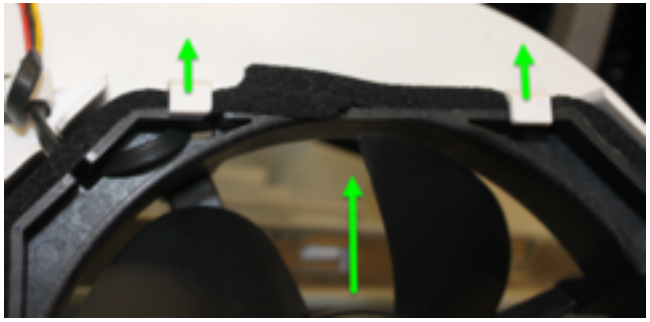
6.14 Replacing Condenser Fan

1.

2. Unplug condenser fan power connector.

3.

4. With a flat blade screwdriver or like tool, gently pry upward on the condenser fan mounting bracket while pulling assembly out away from the unit.



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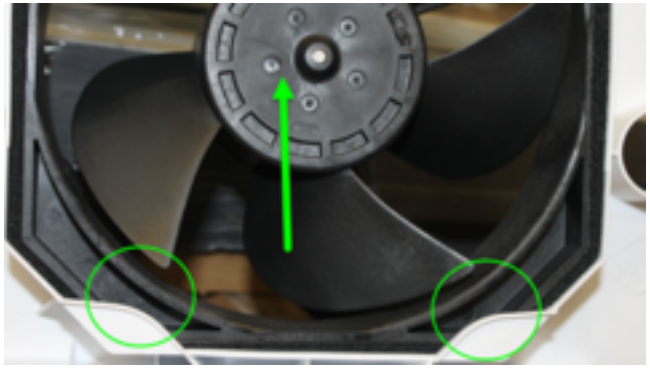
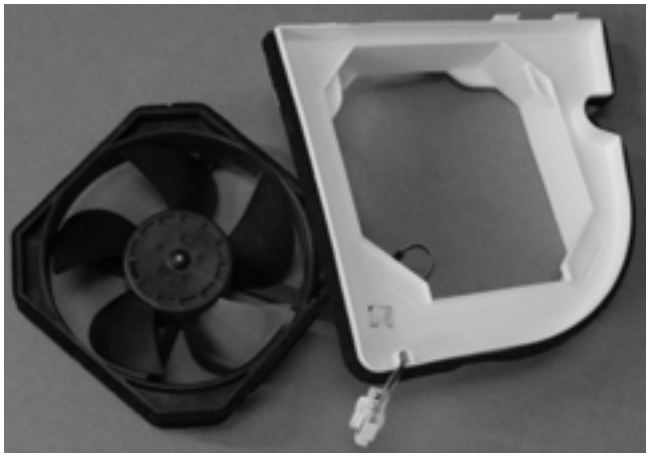
5. While pushing the 2 top clips upward, pull the fan motor up and away from the bracket.





6. Separate the condenser fan motor from its mounting bracket, replace as necessary.

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6.15 Repair/Replace Water Valve

Fig. 110: ***Remove Back Panel***

Remove the screws (4) across the top of the back panel.

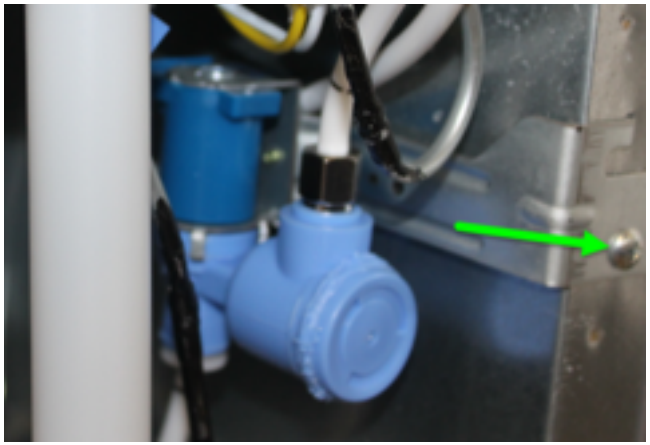

Fig. 111: ***Water Valve***

Remove the screw that secures the mounting bracket to the chassis.

Remove the wire connectors that lead to the magnetic coils.

Remove the water lines that are connected to the inlet and outlet ports. remove, repair or replace the valve as necessary.

►

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6.16 Sealed System Repair

Sealed system repair should be performed by qualified service personnel only. Before entering the sealed system eliminate all other possibilities for inadequate cooling.

Temperatures

What is the freezer temperature?

What is the fresh food compartment temperature?

Air Flow

Are both of the evaporator and condenser fans operating?

Is the damper (air duct assembly) operational?

Is the return air duct from the fresh food compartment to the freezer free of obstructions?

Evaporator

Is the evaporator plugged with ice? (Defrost problem)

Is there a full frost pattern?

Does the suction line going back to the compressor feel cool or warm to the touch?

Is the suction line frozen?

Condenser

Is the condenser clean of dust or pet hair?

Is there enough room around the outside of the refrigerator to allow airflow?

(Especially critical with static and warm wall condensers)

Does the condenser fell cool or warm to the touch?

Compressor

Is the compressor running or has the compressor cycled off on the overload?

Ambient

Is the unit installed in an area where the temperature often exceeds 95 F?

Is the unit installed in an area where the temperature drops below 55 F?

Is the unit installed next to a heat source, range or oven?

The answers to these questions will often pinpoint a condition that could mimic a sealed system problem.

Conditions that can mimic a sealed system failure

Restricted evaporator airflow

Compressor operating current – Lower than normal.

Low side pressure – Lower than normal.

High side pressure – Lower than normal.

Frost Pattern – Under low ambient conditions may be frosted all the way back to the compressor.

Condenser liquid level – Lower than normal.

Condenser temperature – Lower than normal.

Compressor temperature – Cooler than normal.

Compressor discharge line temperature – Cooler than normal.

Suction line temperature – Very cool.

A stopped evaporator fan motor (or an iced evaporator due to a defrost failure) restricts the airflow through the coil. If no air passes through the fins, heat does not transfer to the refrigerant. The refrigerant remains in liquid form all the way through the coil and into the suction line. Under cool ambient conditions, frost could form on the suction line all the way back to the compressor. The symptoms of reduced evaporator air flow are very similar to an overcharge. A closer inspection of the evaporator, however, will clearly indicate that this is an airflow problem. The stopped fan could be caused by an electrical failure or the blade may be stopped due to ice conditions brought about by a defrost problem. Even with the fan running, ice on the coil could reduce air flow enough to create the same symptoms.

Confirming your diagnosis

Replace the fan motor, defrost the evaporator, and diagnose defrost problem.

Additional conditions that can mimic a sealed system failure.

Restricted condenser airflow.

Compress operating current – Higher than normal.

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Low side pressure – Higher than normal.

High side pressure – Higher than normal.

Frost pattern – Normal.

Condenser liquid level – Normal.

Condenser temperature – Warmer than normal.

Compressor temperature – Warmer than normal.

Compressor discharge line temperature – Warmer than normal.

Suction line temperature – Warmer than normal.

Limiting the air that passes across the condenser severely reduces the cooling capacity of the system while increasing power consumption. It really doesn't matter if the failure occurs because the condenser fan is inoperative or because the condenser is so fully packed with debris such as dust, lint or pet hair that air cannot pass through it.

If the condenser is not cooled adequately, as required, internal pressures rise. The condensation point of the refrigerant is increased and does not cool as thoroughly. The refrigerant travels back to the evaporator in a warmer state. The warmer refrigerant raises low side pressures which in turn raises the evaporator coil temperature. A warmer coil results in warmer air entering the freezer, net result is that the system has to work much harder for the same amount of cooling.

Confirming your diagnosis

Clean the condenser or replace inoperative fan motor.

	If opening the sealed system is deemed necessary follow all local codes and rules concerning the handling and recovery of refrigerant gases.

►

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6.17 Summary

1. The information provided in this document is intended for trained, qualified personnel only. The proper function and the safety of the appliance can be affected by an improper repair, and even serious threats to life or physical condition may arise. BSH Home Appliances Corporation is not liable for damages caused by improper repairs performed by unauthorized parties. Local codes and standards apply and must be observed. Contact the Technical Support Team for further assistance.
2. For authorized servicers, additional assistance is available by contacting our Technical Support Team at (800) 444-9091. or Visit QuickFinder at http://portal.mch.bshg.com/portal

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